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Selection of technical parameters of forest biomass briquetting process

Keywords

Forest biomass, forest residues, briquetting, renewable energy.

Abstract

The rational management of forest residues creates the opportunity to obtain unused feedstock for energy purposes. Shredded material can be subjected in compaction processes, increasing his energetic value and physical properties. The idea of forest residues usage is innovative and can be developed as new source of renewable energy. It should be noted, that not homogeneous physical properties of material as irregularity of fractions and material moisture were main problems of forest residues exploitation. The research was conducted to determine the usefulness of the forest residues for the briquettes production.

Determination of the physical properties of shredded forest residues during the briquetting process involves the necessity of designing and construction a specially research station, in the form of a prototype compacting tube. The cylindrical tube was able to heat an applied plant material and controls the pressure value during the briquetting process. Analyzed material was pine shredded wood that came from the forest residues. The material was divided into four independent groups according to fraction length, that measures: $0 \div 1$, $1 \div 4$, $4 \div 8$ and $8 \div 16$ mm. Research results define the impact of material and process factors on the briquetting process and briquette durability according to composed fraction mix.

Based on the results of material parameters correlation, such as moisture content and fraction length at the set process temperatures with the durability coefficient the optimal mix of fraction could be determined, to make a briquette without the need for a binder. According to the product quality, the optimum proportion of fraction lengths, among the analyzed mixes (25, 50 and 75% of the granulometric fraction), contained a percentage of 50-25-25-0 compacting at 73°C.